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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

INTERNAL MEMO

TO: Cindi Mitton **DATE:** **December 20, 2000**

FROM: Michele Ochs

SUBJECT: **Summary of report for Yucca Mountain Repository Oversight Program of Inyo County Planning Dept. titled "Death Valley Springs Geochemical Investigation"**

Introduction

Yucca Mountain is the site of the only proposed high-level nuclear waste repository in the United States. The Yucca Mountain site is located east of Death Valley National Park in Nye County, Nevada. Inyo County has participated in oversight activities for the proposed repository since 1987 to ensure the siting of this project does not adversely impact public health, environment, or Death Valley National Park.

The repository concept uses the philosophy of multiple barriers, both engineered and natural, each of which impedes the movement of redionuclides into the accessible environment. The proposed repository would be in the unstaurated zone above the water table in Tertiary tuffaceous rocks. The principal transporting mechanism for redionuclides is moving ground water. Underlying the repository at approximate 2-km (6,000) feet is an extensive Lower Carbonate Aquifer known to be highly permeable.

Inyo County's Yucca Mountain Oversight Program identified a number of spring sources in the Death Valley Mountain ranges. This report presents the data from samples collected in 1998 from 23 springs and 2 creeks in Death Valley. Samples were analyzed for concentrations of major cations and anions, and isotopic ratios of strontium, uranium, and oxygen. The results were compared to sampling data from the Yucca Mountain site.

Problem

The linkages between the alluvial and carbonate aquifers, the recharge and discharge points, and ground water travel time are key to Inyo County's hydrological concerns about the proposed Yucca Mountain repository. Death Valley is the terminus for surface water drainage from Yucca Mountain and Amargosa Valley. It is also believed that ground water from the Lower Carbonate Aquifer discharges into Death Valley via springs.

Objective of 1998 Sampling

The objective of this geochemical sutdy of spring waters was to help further characterize the ground water in the higher altitude Death Valley mountain blocks, to determine the source of these waters.

Springs of Death Valley

The National Park Service has identified 289 springs and seeps within the boundaries of DVNP. There are different types of springs. The springs with the greatest discharge are located along the steeply dipping Furnace Creek fault system between the Funeral and Black Mountain ranges east of Furnace Creek. The source of water to these springs is of interest because they discharge from Paleozoic-age carbonate of the same age as the Lower Carbonate Aquifers at Yucca Mountain. The USGS has previously sampled these springs and a number of springs in the Black Mountain range for isotopic analysis. This data is included in appendices to this report.

Within DVNP the greatest number of springs are mountain springs and seeps. These are higher altitude and have small volumes of discharge. The chemical composition of these springs were essentially unknown. The characterization of this report is the focus of this report.

Conclusions

The water sampled and analyzed from small-local springs in the vicintiy of Death Valley have a major ion signature that groups the waters nicely by mountain range.

By comparing the deuterium content of the large regional springs in the Furnace Creek area with the deuterium content of the small mountain spring in Death Valley the report constrains the amount of local recharge to the carbonate aquifer in the Funeral Mountains. This is further evidence that the major springs in the Furnace Creek area discharge from the regional carbonate aquifer.

Inyo County has commissioned further reporting that will narrow the focus to the ground water of the Funeral Mountains that is due in October 2001.

Appendices

A – Listing of springs within DVNP
B – Chemical analysis provided by USGS, Piper diagram cation and anion spring data point values

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